

PATENT ABSTRACTS OF JAPAN

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(54) FLOPPY DISK

(57) Abstract:

PURPOSE: To provide a floppy disk which reads system regions even though a servo region is omitted by reasons such as a defect or is wrongly detected.

CONSTITUTION: In the floppy disk employing a sector servo system, system regions 7, which store records such as medium information, are placed at even intervals. By this arrangement, even though a first system region 7a is unable to be read due to the omission of a servo region 4, the servo signal just prior to a second system region 7b establishes a retracking and the second system region 7b is read. When the second system region 7b can not be read, a third system 7c and a fourth system 7d are successively read to protect the system regions.

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CLAIMS

[Claim(s)]

[Claim 1] The floppy disk which was discretized physically and has arranged two or more system areas which are equipped with the user area which carries out record playback of the information of the servo field and user who have been physically stationed mostly with equiangular, and memorize medium information, such as defective information on a medium, and an array of said user area, in addition to said user area.

[Claim 2] It is the floppy disk according to claim 1 by which a system area is mostly arranged with equiangular physically on the same track of the 1st recording surface and the 2nd recording surface, and the system area of said 1st recording surface and the system area of said 2nd recording surface are arranged by turns.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the floppy disk used as external storage, such as a computer.

[0002]

[Description of the Prior Art] In the conventional floppy disk drive unit, the signal with which the data recorded on a medium were sent from the external controller is recorded, and a regenerative signal is also sent to a controller side as it is. Therefore, there is no function to recognize the shift information on a medium that equipment itself is recorded on the medium, and the initial state of equipment, and actuation corresponding to the contents is not carried out. Therefore, the system area which is recording them did not need to be managed with a floppy disk drive unit. However, a hard disk and the floppy disk which controls the actuation according to the array and shift information of a record section on a medium for equipment itself like an optical disk are also being produced commercially by the densification of a record medium, and intelligent-ization of equipment, and the system area which recorded the shift information on a medium and the initial state of equipment with such equipment is needed with-ization in recent years.

[0003] Moreover, in the hard disk, the system area where the defective information on the initial state of equipment or a medium was recorded is used so that it may be well-known. By multiplexing two or more same data to the same recording surface, or recording the same data on two or more recording surfaces, even when it becomes impossible to read the contents of the system area

according to a defect etc., as this system area was compensated in another field, it has secured that safety.

[0004] Drawing 3 shows arrangement of the system area in the conventional hard disk etc. In drawing 3 , 8 is a record medium, 9 is the record reproducing head, and each of 7a-7h is system areas.

[0005] Actuation of the above-mentioned conventional example is explained below. In drawing 2 , the contents of 1st system area 7a are first read for equipment itself at step 21 at the time of starting. 1st system area 7a memorizes the contents to the volatile memory in equipment at step 25, when read-out actuation is ended normally. When an error occurs in 1st system area 7a, the contents of 2nd system area 7b are read, and the same actuation as henceforth is performed.

[0006] Moreover, although drawing 3 shows the case where a system area 7 is recorded on a different recording surface, as shown in drawing 4 , two or more system areas may be recorded succeeding the same recording surface. Also in this case, the same actuation as the case where it is shown in drawing 3 is performed.

[0007] Thus, when the above-mentioned conventional hard disk drive unit also multiplexes a system area, the safety of a system area is securable.

[0008]

[Problem(s) to be Solved by the Invention] However, although many system areas are recordable in a hard disk drive unit since two or more record media exist, a system area can record only two places by the method of the above-mentioned former in that which a recording surface faces front flesh-side 2, and suits by the floppy disk. Since the head and the record medium are used in the high environment of cleanliness at the hard disk drive unit, it is still more common to be used in an environment more ideal than a floppy disk. On the other hand, by the floppy disk, since it is called an exchange medium, the storage situation of a record medium is also various, and the operating environment has been severe conditions compared with the hard disk drive unit. Since a record medium and the record reproducing head touch, possibility that a blemish will be attached to a medium is very larger still compared with a hard disk. And since equipment operates according to the contents of the system area, equipment will say that that this system area is not reproduced cannot operate normally. Therefore, about a system cylinder, the high safety to a system cylinder is required rather than a hard disk.

[0009] Furthermore, in the case of a sector servo system, there was a problem of it becoming impossible to also read the system area multiplexed when there is a defect etc. and it stopped could carry out tracking to the servo field by the conventional method. This invention solves such a conventional problem, can

secure high dependability, and even if a servo field has a defect, it aims at offering the outstanding floppy disk which can read the contents of the system area.

[0010]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention equips the same truck with two or more system areas, and arranges those system areas discretely, and it arranges them so that a servo field may exist between system areas.

[0011]

[Function] Therefore, according to this invention, lack of the system area by a continuous blemish etc. can be prevented by arranging two or more system areas at fixed spacing. Moreover, since tracking is carried out by another servo information when reading the next system area even if it is in the situation which cannot carry out the tracking of the servo information which is just before a system area, without being normally undetectable by the reasons of a defect etc., it is avoidable for a system area to read and to become impossible by the off-track.

[0012]

[Example] Drawing 1 shows one example of the floppy disk in this invention. In drawing 1 , 1 is a magnetic-recording medium, 2 is the truck which divided the

record medium into concentric circular, 3 is a smallest unit storage region (sector), and 4 is a servo field where the servo information for positioning of a head is recorded. Moreover, 5 is a user area which records a user's information, 6 is a system track for recording medium information and equipment information, and 7a, 7b, 7c, and 7d are system areas where medium information and equipment information are recorded, respectively.

[0013] Drawing 2 is a flow chart which shows actuation of the floppy disk drive unit at the time of starting. After switching on a power source, a floppy disk drive unit accesses a criteria track at step 18 first, and checks the criteria location. The criteria track at this time will not be anywhere cared about, if uniquely decided in every equipment. Then, the system track 6 is accessed at step 19, a head is accessed at delivery and step 21 at 1st system area 7a, and the contents are read. The information on a defective field, the information on that shift place, or a format format is recorded on this system area 7a, and a floppy disk drive unit performs record playback actuation of delivery and User Information for a head to the storage region ordered by the host according to such information.

[0014] When 1st system area 7a is not able to reproduce the information currently recorded by the reasons of a defect etc. at this time, the contents currently recorded on 2nd system area 7b currently recorded as a reserve are read. When the contents currently recorded on 2nd system area 7b cannot be

read, either, they are the 3rd system area 7c and the 7d of the 4th system area henceforth.... It reads one by one like the n-th system area.

[0015] By the floppy disk, since there is only one record medium unlike a hard disk, as shown in the conventional example of drawing 3 , it cannot be told to many recording surfaces that a system area is divided. Then, how the dependability of a system area can secure even the record medium of one sheet as shown in drawing 4 must be adopted.

[0016] However, if the servo field 4 which is just before 1st system area 7a has a defect, the servo information currently recorded there may be incorrect-detected to the case which the system area has multiplexed continuously simply like drawing 4 , therefore an error may be made also in the 2nd multiplexed system area 7b which carried out the off-track, and 3rd system area 7c in it. Then, since it arranges as the servo field 4 is surely in front of 7n of system areas, and tracking is anew carried out according to the data of the servo field 4 which is just before that in the 2nd system area 7b even if it makes an error by the off-track by the way of 1st system area 7a, it enables it to read 2nd system area 7b in this example.

[0017] When the blemish on a concentric circle sticks in this case and the system track 6 of that field has been destroyed, it becomes impossible to read a system area, although the 1st example showed the case where the system area

had been discretely arranged to the same field. So, in the 2nd example, the system truck 6 shown in the 1st example as shown in drawing 5 , and the same system truck are arranged to another recording surface. Even if the system area of one recording surface is destroyed by this 2nd example, the dependability of a system area is raised by arranging the same recording surface as another side.

[0018] In the 2nd example, as shown in drawing 5 , if system area 7c is in the same physical angle on the basis of a certain location and while one recording surface will system-area 7a Be rich makes an error in 1st system area 7a, semicircle ***** must be carried out to the following system area 7b. So, in the 3rd example, rotational delay can be shortened by arranging the system area 7 of each recording surface by turns.

[0019] It is the 3rd example, for example, in consisting of four system areas, it arranges like drawing 6 . In drawing 6 , system areas 7a and 7c are recorded on the front recording surface, and system areas 7b and 7d are recorded on another recording surface. Although ***** in the case of making an error in system areas 7a, 7b, and 7c in the case of drawing 5 , and having to reproduce 7d of system areas to it is required 1.5 round at the maximum, in the case of this example, it can be shortened to 3/4 round. When it thinks with actual equipment and the rotational frequency of a medium is 300 [rpm], the difference of 150 [ms] is made at the maximum. That is, latency time can be shortened in one half.

Since most warm-up time of a floppy disk is less than 1 [s], this difference cannot be disregarded.

[0020] In addition, in the 3rd example, although one system area is arranged by turns [each], even if this array arranges alternately with two or more [every] by each recording surface or has arranged by turns in the combination of [load / one / while in one recording surface and] those [two] at a recording surface, the same effectiveness is acquired.

[0021] Although the sequence which a system area 7 reads must be beforehand set up in the 4th example of the above, a system area is detected in the 2nd example shown in drawing 7 by setting a flag in the ID section which shows the address of the information which recording surface is reproduced at the time of starting, and a system area. A format of a system area [in / for a format of the usual sector / the 2nd example] is shown in drawing 8 (a) at drawing 8 (b). 20 is a sink cutting tool for taking a synchronization, and 21, 22, and 23 are a cylinder number cutting tool, a head number cutting tool, and a sector number cutting tool, respectively. Although stood to the head number cutting tool 22 flag 26 in drawing 8 (b), if other actuation is not affected, other cutting tools are satisfactory.

[0022] Drawing 7 is a flow chart which shows the actuation in the 4th example of the above. In drawing 7 , first, at step 27, there is while at the time of starting and

the head of a field is chosen as it. Next, a criteria truck is accessed at step 19 and the criteria location is checked. Then, the flag 26 of delivery and a system area is searched with step 21 for a head on the system truck 6, and the contents will be read if a flag 26 is detected. When this system area 7a is not able to reproduce the information currently recorded by the reasons of a defect etc. at this time, the contents which switch a head to 2nd system area 7b currently recorded as a reserve like the 1st example of the above, and are recorded on 2nd system area 7b are read. When the contents currently recorded on 2nd system area 7b cannot be read, either, they are the 3rd system area 7c and the 7d of the 4th system area henceforth.... It reads one by one like the n-th system area. In the 3rd example, if it was a maximum of 1 rotation ***** after seeking on the system truck 6 until it detects 1st system area 7a, there was nothing, but in this example, someday, since or should just adopt the system area of one recording surface detected early, it can shorten the rotational delay gone half round compared with the 3rd example at the time of starting.

[0023] moreover, the condition that the data of both recording surfaces are always detectable in the 2nd example -- carrying out -- either of all the system areas -- if what was detected early is adopted, it cannot be overemphasized that time amount is shortened more.

[0024]

[Effect of the Invention] In this invention, as shown in the above-mentioned example, the system area is multiplexed, and it has the advantage that the dependability of a system area improves. Furthermore, since this system area is arranged discretely, it is recoverable also to poor read-out by the off-track. Moreover, the effect can be suppressed also about defects, such as a long blemish, to the minimum. Since the system area of each recording surface is furthermore arranged by turns, when poor read-out of a system area occurs, it has the effectiveness that the rotational delay which accesses a spare system area can be shortened.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The front view of the floppy disk in the 1st example of this invention

[Drawing 2] The flow chart which shows the system area read-out sequence at the time of starting in the 1st example and conventional example of this invention

[Drawing 3] The head in the conventional hard disk drive unit, and the perspective view of a record medium

[Drawing 4] The head which has recorded the system area continuously, and the

perspective view of a record medium

[Drawing 5] The front view of the floppy disk in the 2nd example of this invention

[Drawing 6] The front view of the floppy disk in the 3rd example of this invention

[Drawing 7] The flow chart which shows the system area read-out sequence at the time of starting in the 4th example of this invention

[Drawing 8] (a) is the explanatory view of a format of the conventional system area and a user area.

(b) is the explanatory view of a format of the system area in the 4th example of this invention.

[Description of Notations]

1 Record Medium

4 Servo Field

5 User Truck

6 System Truck

7 System Area